

NATIONAL WATER RESEARCH INSTITUTE

Final Report

of the

Independent Advisory Panel

on Reviewing the

Los Osos Wastewater Management Plan Update

December 4, 2006
Fountain Valley, California

Introduction

In August 2006, the Los Osos Community Services District (LOCSD) requested that the National Water Research Institute (NWRI) of Fountain Valley, California, organize an Independent Advisory Panel (Panel) to provide an independent review of the July 28, 2006, draft *Los Osos Wastewater Management Plan Update* (Plan Update), prepared by Ripley Pacific Company.

Los Osos, which has a population of over 15,000, lacks a centralized wastewater collection system and treatment facility. The community is served by septic tanks, leach fields, and cess pits. A number of studies have been conducted over the years, and several wastewater projects have been proposed. For a variety of reasons, no project has been constructed. The purpose of the review of the wastewater management plan was to provide an independent evaluation of the Plan Update project.

The Panel was organized to provide an independent, third-party review of the Plan Update. Panel members include:

- *Chair:* George Tchobanoglous, Ph.D., P.E., University of California, Davis
- Martin B. Feeney, P.G., CHG, Consulting Hydrogeologist (Ventura, CA)
- Robert Jaques, P.E., Private Consultant (Monterey, CA)
- Kenneth K. Tanji, D.Sc., University of California, Davis
- Valerie J. Young, AICP, Environmental Planner and Water Reuse Specialist (San Francisco, CA)

A description of NWRI is included in Appendix A. Short biographies on each Panel member are included in Appendix B.

The Panel held an initial conference call with the LOCSD district engineer and LOCSD consultants on October 25, 2006, to hear an overview presentation on the project in preparation for a November meeting in Los Osos.

The Panel later met with the LOCSD district engineer and LOCSD consultants in Los Osos, California, on November 8-9, 2006. The agenda for that meeting is included in Appendix C. The objectives of the Panel meeting included:

- Providing the Panel with appropriate context and background information regarding the Plan Update.
- Reviewing the assumptions, criteria, and findings of the Plan Update.
- Developing Panel findings and recommendations.

Representatives from the Central Coast Regional Water Quality Control Board (RWQCB) and the San Luis Obispo County Public Works Department (County) were invited by NWRI to attend the meeting. A list of meeting attendees is provided in Appendix C.

The Panel's comments, findings, and recommendations based on a review of written material, presentations, and discussions at the November 8-9, 2006, meeting in Los Osos, are presented in this report.

The report is organized into the following sections:

- Overview.
- Guiding Principles.
- Findings and Recommendations.

1. Overview

The Plan Update prepared by Ripley Pacific Company has provided an extremely valuable service to the Los Osos community by identifying alternative technologies and waste management opportunities that can be used to develop an overall integrated water management plan.

2. Guiding Principles

The Panel developed "Guiding Principles" to provide a perspective on the rationale for the Panel's Findings and Recommendations. While these principles are specifically directed at the Plan Update, they are based on knowledge that the Panel has accumulated from experience associated with planning and implementing wastewater collection, treatment, and reuse systems in California and elsewhere.

The Guiding Principles set forth by the Panel are as follows:

- 2.1 Doing nothing is not an option.
- 2.2 The continued use of individual septic tank/leachfield systems for a community of this size does not reflect the modern state of wastewater management.
- 2.3 Whatever wastewater management system is selected, careful attention must be devoted to the minimization of odors.
- 2.4 Recommended alternatives must solve the problems listed in paragraph 3.1 under "Findings and Recommendations."
- 2.5 The project must be implemented in a timely and cost-effective manner.
- 2.6 Given the many issues related to the wastewater management in Los Osos, it is imperative that priorities be established for project implementation. The first priority of the project must remedy the existing water pollution control problems. Secondary priorities may be incorporated to address other water

management issues, including effluent reuse and addressing saltwater intrusion.

- 2.7 Alternatives should be presented with sufficient detail in terms of description and estimated costs so that rational comparisons can be made.
- 2.8 The costs must be based on a better understanding of the elements for each alternative. Refined and updated cost estimates are needed for each alternative, so voters will understand the costs of what they are voting for under a required Prop 218 vote.
- 2.9 The solution to the saltwater intrusion problem should have lower priority relative to the resolution of wastewater compliance issues. However, the resolution of saltwater intrusion is recognized as a key element of the integrated water management plan.

3. Findings and Recommendations

3.1 What is the problem?

- 3.1.1 There is groundwater pollution from leaching of septic wastewater, as well as a rise in the shallow groundwater level due to septic system discharges.
- 3.1.2 The resulting pollution of the upper aquifer has forced the community to pump from the lower aquifer for water supply, which has resulted in overpumping of that aquifer, thus causing seawater intrusion in the deep aquifer zones.
- 3.1.3 Septic system discharges are polluting surface water supplies (for example, the Morro Bay shoreline).
- 3.1.4 RWQCB enforcement action is pending.
- 3.1.5 Los Osos has not corrected the problem for more than 30 years.

3.2 Collection Systems

- 3.2.1 The STEP/STEG system is a well-developed technology and is a viable alternative to the gravity collection system.
- 3.2.2 With both types of collection systems (i.e., STEP/STEG and conventional gravity with pump stations), it is imperative that the costs of connection from each home to the transmission line and the cost of property restoration be included in the total cost estimate for collection.

- 3.2.3 Regardless of which type of collection system is selected, consideration should be given to the use of vacuum sewers in low lying areas along Morro Bay.
- 3.2.4 Clarifications of homeowner responsibilities need to be made for each collection option.
- 3.2.5 Clear delineation of annual capital and operating costs for every collection alternative should be set forth, so the least costly alternative can be identified.
- 3.2.6 The cost estimates for the collection system must be thorough and complete and include ongoing maintenance requirements for both the homeowner and the operating agency.
- 3.2.7 The economic benefits of septic tank pretreatment should be considered in the cost estimates for alternative treatment technologies. Such an analysis should also include the economic benefit of reduced biosolids production.
- 3.2.8 The economic benefits of reduced inflow and infiltration (I/I) achieved by the use of small-diameter effluent pressure collection should be considered in the cost estimates for alternative treatment technologies.

3.3 Treatment Plant Sites

- 3.3.1 There are two potential plant locations for the treatment facility: in-town or out-of-town, each with their own implementation challenges.
- 3.3.2 Given the number of problematic issues with the downtown site, it is the unanimous opinion of the Panel that an out-of-town site(s) is a better alternative.
- 3.3.3 If an out-of-town site is selected, a return line for recycled water that could be used for various applications within the community should be considered as part of an initial phase.
- 3.3.4 Because of the potential benefits and economic cost savings of constructing a return line concurrently with the collection system, the Department of Health Services (DHS)-required pipeline separation distance should be appealed.

3.4 Treatment Technologies

- 3.4.1 The least costly and most easily implemented solution would involve appropriate treatment out-of-town with land application (with spray irrigation). Reuse options could be added at a later date (phase) to return water for in-town landscape irrigation, for agricultural reuse, and for irrigation of cemeteries and playgrounds.

- 3.4.2 Regardless of the type of treatment process selected, the process should be designed to allow for nitrogen removal, if needed.

3.5 Wastewater Disposal and Reuse

- 3.5.1 Effluent disposed by land application (i.e., spray irrigation) will not need to undergo nitrogen removal when applied at agronomic rates.
- 3.5.2 In the future, if water is used for agricultural purposes, preference should be given to non-food crops, such as turf grasses, pastures, and dry-land farmed crops, where less-restrictive Title 22 regulations apply. The removal of some nitrogen may be required for agronomic applications.
- 3.5.3 If the Broderson site is used for effluent disposal, it is important to evaluate compliance with the new DHS Groundwater Recharge Reuse criteria (because there is no vadose zone and there would be intentional recharge to the upper aquifer, which has historically been used for potable supply).
- 3.5.4 The beneficial use of treated effluent should be considered as part of a comprehensive Integrated Water Management Plan that should be developed concurrently with implementation of the Wastewater Management Plan.
- 3.5.5 Winter storage is required for land application, as well as for zero-discharge of effluent.

3.6 Public Communication Programs

- 3.6.1 There is no compelling evidence that either the County or LOCSD has a clear understanding of how the public views the various options and alternatives at this point in time.
- 3.6.2 A public outreach campaign is needed that leads to a positive Proposition 218 vote (property owners). Build a program around the people who support the need for a wastewater solution.
- 3.6.3 The County, in close collaboration with LOCSD, should assume the responsibility of being the source of credible information for the project.
- 3.6.4 There will be a need to develop a long-term communications program for wastewater management to build and maintain public support and acceptance for the project.

3.7 Permits and Schedule

- 3.7.1 Maximum use of the existing certified Environmental Impact Report (EIR) should be made for the out-of-town treatment plant site and disposal areas.

- 3.7.2 An Addendum to the EIR should be considered to expedite the California Environmental Quality Act (CEQA) process.
- 3.7.3 Discussions should be undertaken with the Coastal Commission to ensure that existing permits can be amended rather than applying for new permits.
- 3.7.4 The County needs to expedite the development and implementation of the wastewater management system to demonstrate to the RWQCB a commitment to fix the problems.
- 3.7.5 Every effort should be made to reestablish this project as a funding priority under the State Revolving Fund (SRF) program. Private financing may be considered for the project as an alternative to the SRF alternative.
- 3.7.6 The Central Coast RWQCB's 2010 compliance date appears to be somewhat arbitrary. The most optimistic estimate of the overall time period to complete the project is approximately 4 years:
 - 1 year will be required to complete the planning process, including the Proposition 218 vote.
 - 1 year to prepare the final design.
 - 2 to 3 years for construction of the project (collection, treatment, and land application).
- 3.7.7 Opportunities for phasing the construction of the collection system should be evaluated.

3.8 Relationship of the Wastewater Project to Water Management Planning

- 3.8.1 The current Coastal Development Permit for the wastewater project requires that a wastewater management plan and a water management plan, as well as a habitat conservation plan (HCP), all be in place before additional connections can be made.
- 3.8.2 Completion of the wastewater management plan is an integral component in the development of the integrated water management plan.
- 3.8.3 The County should seek to secure funding under Proposition 50 and potentially Proposition 84.

Appendix A: National Water Research Institute

A 501(c)3 non-profit organization, NWRI was established in 1991 and is devoted to water education, research, and related activities. NWRI is governed by a Board of Directors consisting of representatives of six water and wastewater agencies in Southern California.

The mission of NWRI is to *create new sources of water supply through research and technology and to protect the freshwater and marine environments*. NWRI fulfills this mission by sponsoring cutting-edge research with a focus on practical results. NWRI also supports students through its many outreach programs; sponsors seminars, workshops, and conferences on critical issues facing the water community; and conducts Independent Advisory Panels for water and wastewater agencies and government agencies to provide a third-party review of plans and projects.

The only public-private partnership of its kind in the United States, NWRI receives its core funding from the Joan Irvine Smith & Athalie Richardson Irvine Clarke Foundation. NWRI leverages its resources through extensive collaborations with universities, federal and state agencies, and other associations and research organizations. Through these cooperative efforts, NWRI's has funded over 160 research projects with over 100 partners in the past 15 years, resulting in numerous peer-reviewed publications.

Appendix B: Panel Member Biographies

GEORGE TCHOBANOGLIOUS, Ph.D., P.E. (Chair)

Professor Emeritus

University of California, Davis (Davis, California)

For over 35 years, wastewater expert George Tchobanoglous has taught courses on water and wastewater treatment and solid waste management at the University of California, Davis, where he is Professor Emeritus in the Department of Civil and Environmental Engineering. He has authored or coauthored over 350 publications, including 13 textbooks and five engineering reference books. Tchobanoglous has been past President of the Association of Environmental Engineering and Science Professors and currently serves as a national and international consultant to both government agencies and private concerns. Among his honors, he received the Athalie Richardson Irvine Clarke Prize from NWRI in 2003, was inducted to the National Academy of Engineers in 2004, and received an Honorary Doctor of Engineering degree from the Colorado School of Mines in 2005. Tchobanoglous received a B.S. in Civil Engineering from the University of the Pacific, an M.S. in Sanitary Engineering from the University of California, Berkeley, and a Ph.D. in Environmental Engineering from Stanford University.

MARTIN B. FEENEY, P.G., CHG

Consulting Hydrogeologist (Ventura, California)

Martin Feeney has been a consulting hydrogeologist since 1997, providing hydrogeologic consulting services to water agencies, private industry, and engineering firms. Prior to this, he served as hydrogeologist at various consulting firms such as Balanced Hydrologics, Inc. and Fugro West, Inc., where he provided analysis of groundwater basins, developed groundwater flow and transport, and developed saline groundwater source for desalination plants, injection wells/artificial recharge programs, and underground storage tank site assessment and remediation. He has been involved in numerous groundwater resources and water well projects throughout California, working for groups such as Monterey County, Salinas Valley, Santa Clara Valley Water District, Ventura County, and various others. Feeney received a B.S. in Earth Sciences from the University of California, Santa Cruz and an M.S. in Environmental Planning (Ground Water) from California State University.

ROBERT JAQUES, P.E.

Private Consultant (Monterey, California)

Bob Jaques has been a private engineering consultant since retiring from the Monterey Regional Water Pollution Control Agency in September 2005 after 30 years of service. During that time, he directed the planning, design, and construction of a wide-range of infrastructure projects, including a 30-mgd regional wastewater collection, treatment, and disposal system and a regional water recycling facility irrigating food crops. His areas of

interest include obtaining permits and approvals for various types of water and wastewater projects, and coordinating these activities with the County Health Department, the Regional Water Quality Control Board, and other regulatory agencies; preparing concept-level wastewater treatment alternatives studies; and preparing storm water programs, budgets, and work plans for Phase II storm water entities. He also continues to work part-time for the Monterey Regional Water Pollution Control Agency on certain projects and programs, including serving as the Program Manager for the regional storm water program of seven participating entities and five coordinating entities. Jaques received a B.S. and M.S. in Civil Engineering from the University of California, Berkeley.

KENNETH K. TANJI, D.Sc.

Professor Emeritus, Hydrology Program

University of California, Davis (Davis, California)

Ken Tanji retired from the University of California, Davis after 41 years as a Professor of Hydrology in the Department of Land, Air, and Water Resources. During that time, he had also served as Department Chair, Assistant Director of the University of California's Agricultural Experiment Station, and Director of the Kearney Foundation of Soil Science. He is internationally recognized in water-quality aspects of irrigation and drainage, and is the editor of the manual, *Agricultural Salinity Appraisal and Management*, published by the American Society of Civil Engineers. Currently, he heads a team developing a *Salinity Guide for Irrigation of Landscapes with Recycled Water* in the Los Angeles-San Diego corridor. Tanji received a B.A. in Chemistry from the University of Hawaii, an M.S. in Soil Chemistry from the University of California, Davis, and a D.Sc. in Irrigation, Drainage and Hydrological Engineering from Kyoto University in Japan.

VALERIE J. YOUNG, AICP

Senior Environmental Planner and Water Reuse Specialist (San Francisco, California)

Valerie Young is a senior environmental planner and water reuse specialist with over 26 years of professional planning experience, having spent 10 years working in the public sector and 15 years working as a consultant with CH2M HILL in California and The Louis Berger Group in New York. Currently, she has an independent consulting practice. Since 1993, she has focused her environmental planning work on recycled water and water-related projects in California. Her primary role has been to shepherd these projects through the environmental review process, preparing environmental documents and addressing community and agency concerns. She was also worked closely with engineers to ensure mitigation measures are incorporated into recycled water projects during design, construction, and operation. Young received a B.A. in History from the University of California, Santa Barbara, and an M.A. in Geography/Planning from Arizona State University.

Appendix C: Panel Meeting Agenda

NWRI Independent Advisory Panel Meeting: Los Osos Wastewater Management Plan Update Review

FINAL Meeting Agenda November 8-9, 2006

Meeting/Hotel Location

Sea Pines Resort
1945 Solano St.
Los Osos, CA 93402
(805) 528-5252

On-Site Contacts

Tammy Russo (NWRI)
Cell: (714) 614-7386
Jeff Mosher (NWRI)
Cell: (714) 705-3722

Meeting Objectives:

1. Provide panel with appropriate context and background information regarding the DRAFT Los Osos Wastewater Management Plan Update.
2. Review the assumptions, criteria, and findings of the Plan Update.
3. Develop panel findings and recommendations.

Wednesday, November 8, 2006

8:30 - 11:00 am	Tour of Project Sites	
11:15 - 11:30 am	Welcome and Introductions - Jeff Mosher (NWRI) - George Tchobanoglous (Panel Chair)	
11:30 - 12:00 noon	Status of Project	Rob Miller (LOCSD)
12:00 - 1:00 pm	Lunch	
1:00 - 2:30 pm	Discussion Questions: - General - STEP/STEG - Site Selection - Environmental and Public Acceptance - Agricultural Users - Agricultural Use Plan - Treatment Technologies - Storage - Costs - Other?	George Tchobanoglous
2:30 - 2:45 pm	Break	
3:00 - 4:00 pm	Discussion - Continued	
4:00 - 5:30 pm	Panel Only Discussion	

Thursday, November 9, 2006

8:30 - 10:30 am	Panel Discussion with Consultant Team	George Tchobanoglous (Panel Chair)
10:30 - 10:45 am	Break	
10:45 - 12:00 noon	Panel Only Discussion	
12:00 - 1:00 pm	Lunch	
1:00 - 2:30 pm	Panel Only Discussion	
2:30 pm	Adjourn	

Appendix D: List of Attendees at November 8-9, 2006, Panel Meeting

Panel Members:

- *Chair:* George Tchobanoglous, Ph.D., P.E., University of California, Davis
- Martin B. Feeney, P.G., CHG, Consulting Hydrogeologist (Ventura, CA)
- Robert Jaques, P.E., Private Consultant (Monterey, CA)
- Kenneth K. Tanji, D.Sc., University of California, Davis
- Valerie J. Young, AICP, Environmental Planner and Water Reuse Specialist (San Francisco, CA)

NWRI Staff:

- Jeffrey J. Mosher, Executive Director
- Gina Melin, Communications Specialist
- Tammy Russo, Administrative Coordinator

Los Osos Community Services District and Consultants:

- Robert S. Miller, P.E., District Engineer (Wallace Group)
- Dana K. Ripley, P.E. (Ripley Pacific Company)
- Sean Tobin (MVE, Inc./RPC Team)
- Ryan Vance, PLS (MVE, Inc./RPC Team.)
- Joe Leach, PE (MVE, Inc./RPC Team)
- Jeff Palin (MVE, Inc./RPC Team)

San Luis Obispo County Public Works Department Staff and Consultants:

- Paavo A. Ogren, Deputy Director
- Lou Carella P.E. (Carollo Engineers)
- Karl W. Hadler, P.E. (Carollo Engineers)

Central Coast Regional Water Quality Control Board:

- Matt Thompson, P.E., Water Resource Control Engineer
- Allison Dominguez, Environmental Scientist

Published by:
National Water Research Institute

10500 Ellis Avenue
P.O. Box 20865
Fountain Valley, CA 2728-0865
(714) 378-3278
(714) 378-3375 (fax)
www.NWRI-USA.org